

## CLAIMS

1. A method for switching among a plurality of modes for ADSL modem operation, the method comprising the steps of:

determining a far end modem's capability for supporting one or more of a base mode, a first mode and a second mode;

determining a loop length between a near end modem and the far end modem;

determining a capacity in an upper band of the first mode and the second mode; and

selecting an appropriate mode based on a combination of the far end modem's capability, the loop length and the capacity in the upper band.

2. The method of claim 1, wherein the near end modem and the far end modem are trained in the base mode upon initial power up.

3. The method of claim 1, wherein the step of determining the capacity in the upper band further comprises determining whether the capacity in an upper 256 bins is below a threshold.

4. The method of claim 1, wherein the step of determining the capacity in the upper band further comprises determining whether the capacity in an upper 512 bins is below a threshold.

5. The method of claim 1, wherein the base mode is an Annex mode.

6. The method of claim 1, wherein the first mode is ADSL Plus.

7. The method of claim 1, wherein the second mode is ADSL Quad.

8. The method of claim 1, wherein the step of determining an appropriate mode is performed at a CO end.

9. The method of claim 8, wherein the steps are performed during a handshake/training session.

10. The method of claim 1, wherein the loop length is determined by a received power level calculation.

11. The method of claim 1, wherein the capacity in the upper band is determined at the far end modem and transmitted to the near end modem.

✓  
12. A system for switching among a plurality of modes for ADSL modem operation, the system comprising:

a module for determining a far end modem's capability for supporting one or more of a base mode, a first mode and a second mode;

5 a module for determining a loop length between a near end modem and the far end modem; and

a module for determining a capacity in an upper band of the first mode and the second mode; wherein an appropriate mode is selected based on a combination of the far end modem's capability, the loop length and the capacity in the upper band.

10 13. The system of claim 12, wherein the near end modem and the far end modem are trained in the base mode upon initial power up.

14. The system of claim 12, wherein determining the capacity in the upper band further comprises determining whether the capacity in an upper 256 bins is below a threshold.

15 15. The system of claim 12, wherein determining the capacity in the upper band further comprises determining whether the capacity in an upper 512 bins is below a threshold.

16. The system of claim 12, wherein the base mode is an Annex mode.

17. The system of claim 12, wherein the first mode is ADSL Plus.

20 18. The system of claim 12, wherein the second mode is ADSL Quad.

19. The system of claim 12, wherein determining an appropriate mode is performed at a CO end.

20. The system of claim 19, wherein the system operates during a handshake/training session.

25 21. The system of claim 12, wherein the loop length is determined by a received power level calculation.

22. The system of claim 12, wherein the capacity in the upper band is determined at the far end modem and transmitted to the near end modem.

23. At least one processor readable carrier for storing a computer program of instructions configured to be readable by at least one processor for instructing the at least one processor to execute a computer process for performing the method as recited in claim 1.

5 24. At least one signal embodied in at least one carrier wave for transmitting a computer program of instructions configured to be readable by at least one processor for instructing the at least one processor to execute a computer process for switching among a plurality of modes for ADSL modem operation by performing the steps of:

10 determining a far end modem's capability for supporting one or more of a base mode, a first mode and a second mode;

determining a loop length between a near end modem and the far end modem;

determining a capacity in an upper band of the first mode and the second mode;

and

15 selecting an appropriate mode based on a combination of the far end modem's capability, the loop length and the capacity in the upper band.